

What is claimed is:

1. A method of calibrating an optical pick-up unit, the method comprising the steps of:

- (a) applying a known voice coil slew rate to a lens, at a first location on a disc;
- (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus;
- (c) monitoring a sum signal while the lens moves through the distance range;
- (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus;
- (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus; and
- (f) calculating a voice coil gain using the calculated sum signal slew rate.

2. The method according to claim 1, further comprising the step of:

- (g) calculating a voice coil voltage offset using the calculated voice coil gain and an offset distance.

3. The method according to claim 2, further comprising the step of:

- (h) calibrating an input voice coil voltage using the calculated voice coil voltage offset.

4. The method according to claim 1, further comprising the step of:

- (g) repeating steps (a) – (f) at a second location on the disk.

5. The method according to claim 1, wherein the step of (f) calculating a voice coil gain comprises dividing the sum signal slew rate by the voice coil slew rate.

6. The method according to claim 2, wherein the step of (g) calculating a voice coil voltage offset comprises dividing the offset distance by the calculated voice coil gain.

7. The method according to claim 1, further comprising the step of:
(g) moving the lens an offset distance based on the calibrated voice coil voltage.

8. The method according to claim 1, wherein the step of (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus comprises:

moving the lens in a first direction past the distance at which the lens is in optimum focus, to generate a first sum signal; and

moving the lens in a direction opposite to the first direction past the distance at which the lens is in optimum focus, to generate a second sum signal.

9. The method according to claim 6, wherein the step of (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus comprises:

identifying a peak in the first sum signal at which the lens is in optimum focus; and

identifying a peak in the second sum signal at which the lens is in optimum focus,

and wherein the step of (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus comprises:

calculating a first sum signal slew rate from the peak in the first sum signal;

calculating a second sum signal slew rate from the peak in the second sum signal; and
averaging, filtering, or regressing the first and second sum signal slew rates.

10. The method according to claim 1, wherein the step of (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus comprises:

moving the lens past the distance at which the lens is in optimum focus a plurality of times;
generating sum signals for each time the lens moves past the distance at which the lens is in optimum focus.

11. The method according to claim 10, wherein the step of (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus comprises:

identifying a peak in each of the sum signals corresponding to the distance at which the lens is in optimum focus,
and wherein the step of (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus comprises:

calculating sum signal slew rates from the peak in the each of the sum signals; and
averaging, filtering, or regressing the sum signal slew rates.

12. A program product for calibrating an optical pick-up unit, the program product comprising machine readable program code for causing, when executed, a machine to perform the following method:

(a) applying a known voice coil slew rate to a lens, at a first location on a disc;

- (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus;
- (c) monitoring a sum signal while the lens moves through the distance range;
- (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus;
- (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus; and
- (f) calculating a voice coil gain using the calculated sum signal slew rate.

13. The programmed product according to claim 12, wherein the method further comprises the step of:

- (g) calculating a voice coil voltage offset using the calculated voice coil gain and an offset distance.

14. The programmed product according to claim 13, wherein the method further comprises the step of:

- (h) calibrating a voice coil voltage using the calculated voice coil voltage offset.

15. The program product according to claim 12, wherein the method further comprises the step of:

- (j) repeating steps (a) – (f) at a second location on the disk.

16. The program product according to claim 12, wherein the step of (f) calculating a voice coil gain comprises dividing the sum signal slew rate by the voice coil slew rate

17. The program product according to claim 13, wherein the step of (g) calculating a voice coil voltage offset comprises dividing the offset distance by the calculated voice coil gain.

18. The program product according to claim 12, wherein the method further comprises the step of:

(g) moving the lens an offset distance based on the calibrated voice coil voltage.

19. The program product according to claim 12, wherein the step of (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus comprises:

moving the lens in a first direction past the distance at which the lens is in optimum focus, to generate a first sum signal; and

moving the lens in a direction opposite to the first direction past the distance at which the lens is in optimum focus, to generate a second sum signal.

20. The program product according to claim 19, wherein the step of (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus comprises:

identifying a peak in the first sum signal at which the lens is in optimum focus; and

identifying a peak in the second sum signal at which the lens is in optimum focus,

and wherein the step of (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus comprises:

calculating a first sum signal slew rate from the peak in the first sum signal;

calculating a second sum signal slew rate from the peak in the second sum signal; and
averaging the first and second sum signal slew rates.

21. The program product according to claim 12, wherein the step of (b) moving the lens through a distance range which includes a distance at which the lens is in optimum focus comprises:

moving the lens past the distance at which the lens is in optimum focus a plurality of times;
generating sum signals for each time the lens moves past the distance at which the lens is in optimum focus.

22. The program product according to claim 21, wherein the step of (d) identifying a peak in the sum signal corresponding to the distance at which the lens is in optimum focus comprises:

identifying a peak in each of the sum signals corresponding to the distance at which the lens is in optimum focus,
and wherein the step of (e) calculating a sum signal slew rate from the sum signal peak corresponding to the distance at which the lens is in optimum focus comprises:

calculating sum signal slew rates from the peak in the each of the sum signals; and
averaging, filtering, or regressing the sum signal slew rates.

23. A laser imagible apparatus comprising:

a lens;

a media tray; and

an adjustment mechanism configured (a) to determine a voice coil gain for substantially all locations on a media.

24. The laser imagible apparatus according to claim 23, wherein the adjustment mechanism is also configured (b) to adjust a distance between the lens and a media on the media tray in response to the voice coil gain determined at each location on the media.

25. The laser imagible apparatus according to claim 24, wherein the adjustment mechanism is configured to adjust the lens to be at a predetermined offset distance with respect to a distance corresponding to an optimum focus at substantially all locations on a media in the media tray.

26. The laser imagible apparatus according to claim 25, wherein if $0\mu\text{m}$ is defined as the distance at which the lens is in optimum focus with respect to a media, the predetermined offset distance is between about $-80\mu\text{m}$ and about $+20\mu\text{m}$ disc.

27. The laser imagible apparatus according to claim 25, wherein if $0\mu\text{m}$ is defined as the distance at which the lens is in optimum focus with respect to a media, the predetermined offset distance is about $30\mu\text{m}$ toward the disc.

28. An optical drive comprising:
a lens;
a disc tray; and
means for determining a voice coil gain for substantially all locations on a disc.

29. The optical drive according to claim 28, further comprising:
means for adjusting a distance between the lens and a disc on the disc tray in response to the voice coil gain determined at each location on the disc.

30. The optical drive according to claim 29, wherein the means for adjusting a distance between the lens and the disc is configured to adjust the lens to be at a predetermined offset distance with respect to a distance corresponding to an optimum focus at substantially all locations on a disc in the disc tray.

31. The optical drive according to claim 30, wherein if $0\mu\text{m}$ is defined as the distance at which the lens is in optimum focus with respect to a disc, the predetermined offset distance is between about $-80\mu\text{m}$ and about $+20\mu\text{m}$ disc.

32. The optical drive according to claim 30, wherein if $0\mu\text{m}$ is defined as the distance at which the lens is in optimum focus with respect to a disc, the predetermined offset distance is about $30\mu\text{m}$ toward the disc.